F. M. POTTENGER, M. D. (Monrovia).—One of the most interesting suggestions that has been made in the dietary treatment of tuberculosis in recent years has been the Gerson, Hermannsdorfer, and Sauerbruch diet. This diet has the particular feature of being a departure from the old caloric and the newer vitamin diet, and one that has taken into consideration the salts of the body.

The intention of the authors is to produce an acid diet and one which causes a certain degree of dehydration of the tissues. When the diet is thoroughly analyzed, however, it is quite probable that it may not be an acid diet after all.

This diet seems to have produced certain definite improvement in skin tuberculosis which might be partly due to the relationship of the skin to the salt of the body. The skin contains a very large percentage of the salt content of the body, and in some way it might have an influence on the healing of tuberculosis, all of which has not been proved.

The great difficulty in a diet of this kind is its impracticability. Patients with tuberculosis must eat an ample amount of food over a long period of time in order to keep their nutrition sufficiently high to bring about healing. People who are accustomed to using salt in their food find it exceedingly difficult to eat food that is free from this flavor. This may be only a matter of habit; at the same time it is one that is well ingrained.

The experiments of Doctors Bogen and Rachmel seem to bear out the general opinion of others to the effect that there is no recognizable difference in the improvement of those on this diet and those who are on the normal diets. There would have to be some very definite advantage if one were to be able to secure the coöperation of patients over the long period necessary to bring about a healing.

I have found that the most satisfactory method of treating patients is to give them a wide choice of foods. We try to have them build their diet around a quart of milk a day, which can usually be taken very readily and which furnishes a complete diet with an abundance of the usual and necessary vitamins. I add to this the general diet of cereals, meats, eggs, leafy vegetables, tubers, salads, and fruit.

It is fortunate that during all the time that we have been working on diets for tuberculous people the normal diet taken by most of them includes not only the calories, but the vitamins and the salts that are necessary to the maintenance of health.

RUPTURE OF URETER—A MEDICO-LEGAL PROBLEM*

REPORT OF CASES

By MILEY B. WESSON, M.D.
San Francisco

DISCUSSION *by A. H. Rosburg, M.D., San Francisco; J. J. Crane, M.D., Los Angeles; William E. Stevens, M.D., San Francisco.*

A NORMAL ureter cannot be punctured by a catheter. This is not true if a wire stylet is used or the catheter is equipped with a whalebone tip. Diseased ureters whose walls have been eroded by a stone may leak, due to pressure of urine above the stone or pyelographic fluid injected by syringe pressure below, and the accident not be recognized until late because of the relative absence of untoward symptoms.

Aside from external traumatism, the commonest cause of extravasation from kidney pelves or ureter is necrosis from an impacted calculus. When the actual urinary leakage is minimal in amount and there is a prompt tissue reaction, the process may be localized with or without the development of a circumscribed abscess, and the patient frequently recovers without any surgery. However, if the organisms are virulent and the tissue resistance is poor, a devastating phlegmonous gangrenous infection, or septicemia, may then ensue and the patient's condition rapidly becomes critical. Hence, it must be accepted as a working principle that extravasation of urine wherever located and from whatever source is a frank surgical condition. Incision and drainage is the operation indicated. But the time depends upon the acuteness of the infection and the condition of the patient; consequently, failing to operate or delaying operation in cases of urinary extravasation is *per se* not an evidence of malpractice but may indicate good surgical judgment.

Urine will leak through a hole in the ureter only when there is an obstruction to drainage down the ureter, and when the channel of the blocked ureter has been opened the extravasated urine or perinephritic abscess will frequently flow back through the fistula, which in time will spontaneously heal.

REVIEW OF THE LITERATURE

Geisinger [1] recently reported two such cases.

One was of a 52-year-old man who during the preceding five years had had five attacks of renal colic, alternating sides, and on one occasion had passed a small calculus. The pyeloureterogram showed a fistula near the ureteropelvic juncture, with a large extravasation. Because of the poor condition of the patient and the fact that he was improving under catheter drainage, operation was postponed. Eventually, because of the poor function of the kidney, a nephrectomy was done. It was then found that the extravasated urine had drained back into the ureter, the cavity being replaced by scar tissue, and the site of the fistula could not be found. The pathologist reported acute diffuse nephritis with multiple abscesses.

The second patient also recovered without operation, but with no impairment of kidney function. The patient was a 37-year-old man who complained of a

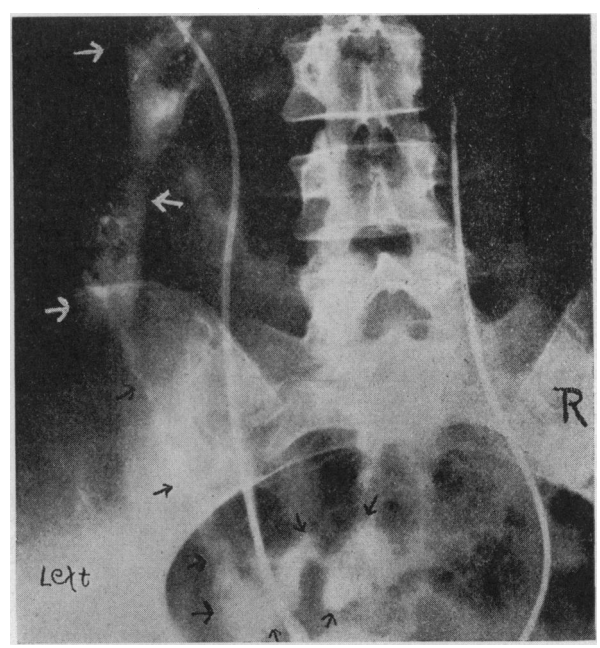

Fig. 1 (Case 1).—Sodium iodid injected through left catheter outlines site of old perinephritic abscess and then trickles down intestinal tract into rectum.

* Read before the Urological Section of the California Medical Association at the sixty-first annual session at Pasadena, May 5, 1932.

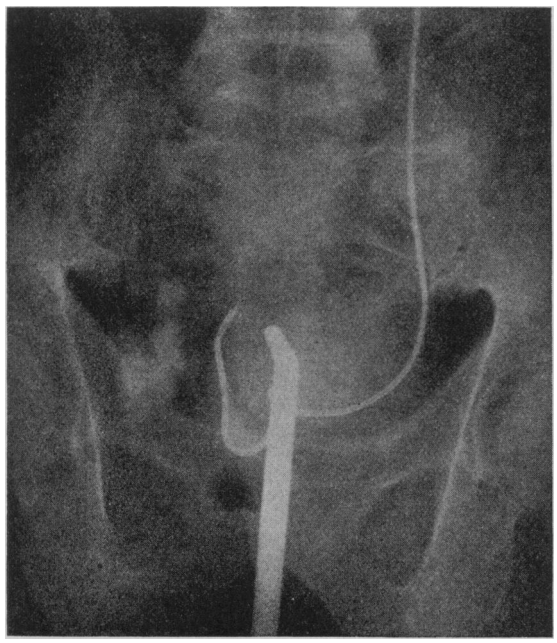

Fig. 2 (Case 2).—Catheter broken against stone. Extravasation of sodium iodid.

continuous decline in health, loss of weight, marked anemia and sepsis, and for two weeks he had noticed a pain and tumor in the upper right quadrant. A flat plate showed stones in the kidney and ureter. Through a ureteral catheter thick pus was aspirated and following this there was a free flow of urine and a decrease in the size of the mass. Thirteen and a half per cent sodium iodid was injected and the picture showed a ureteral fistula and extravasation. Immediate operation was urged and refused, the patient disappeared and it was presumed that he had promptly died. Six weeks later he returned, the picture of health, and announced that he was ready for operation; but investigation showed that the extravasation had drained back into the ureter and the fistula in the ureter had healed.

A perinephritic abscess may burrow through to the surface and rupture externally in Petit's triangle, as in Dr. John F. Pruett's case. A ship steward bumped his loin in making up a bed and several months later a fistula developed. Roentgenograms showed stones in the kidney, and injection of the fistula resulted in a beautiful pyeloureterogram.[2]

Dr. Hugh H. Young[3] has reported a case of ruptured ureter from the Johns Hopkins Hospital. A Kelly cystoscope, with catheter and copper stylet, was used and there was a perforation of the ureter. The 61-year-old woman developed a temperature of 103 degrees and there was considerable local pain. She was treated by rest in bed, and seven days later was discharged no worse from her experience.

REPORT OF CASES

Case 1.—*Perforation of ureter and drainage of resultant perinephritic abscess by spontaneous rupture into descending colon.* (Courtesy of Dr. Robert V. Day.) A 37-year-old woman, who for over three months had had a low-grade septic temperature and pain in lower abdomen, was cystoscoped April 7, 1929, because of frequency, urgency, dysuria, and pyuria. Infected urine was collected from the right catheter and bubbles of gas came through the left catheter. X-ray showed right ureteral calculus and on the left an irregular distribution of shadowgraphic fluid from the tenth rib to below the iliac crest (Fig. 1). A barium enema proved the connection between the descending colon and kidney. Following right ureterolithotomy and drainage of left pelvis there was an uneventful recovery, with the persistence of an intestinal fistula.

Comment.—Apparently a stone, obstructed at the ureteropelvic juncture, eroded through and the extravasation resulted in a perinephritic abscess that burrowed into the descending colon and there discharged the stone, leaving a fistula.

Case 2.—*Extravasation of thirteen and one-half per cent sodium iodid between layers of pelvic fascia, due to stone in ureter and syringe pressure.* A 54-year-old male had a left ureteral stone of the mulberry type, with a hole in the center which gradually closed, accompanied by severe systemic reactions from the infected kidney. Attempts to dislodge the stone with stiff ureteral catheters were unsuccessful (Fig. 2). Sodium iodid was injected under great pressure, using a ten cubic centimeter Luer syringe, in an effort to force the pyelographic medium past the obstruction so as to make a pyelogram. The patient complained immediately of severe burning at the bladder neck, as if boiling water had been injected (Fig. 3). This discomfort persisted for several days, otherwise there were no untoward symptoms. The stone, which lay in the pelvic spindle, was removed by open operation.

Comment.—The ureteral wall had undoubtedly been weakened by pressure necrosis from the impaction of the rough stone. Pressure of overdistending the plugged ureteral spindle in addition to the traumatism of the catheter, caused the wall to become sieve-like and to leak, but the catheter did not penetrate the wall although sufficient force was used to break the tip. The extravasated pyelographic medium followed the fascial planes downward to the bladder neck. Since there was no urine below the stone the extravasation consisted wholly of 13½ per cent sodium iodid—a normal intravenous preparation—which was promptly absorbed.

Case 3.—(Courtesy of Dr. George W. Hartman.) This case is comparable in all ways to the preceding one. The patient was a middle-aged man. An attempt

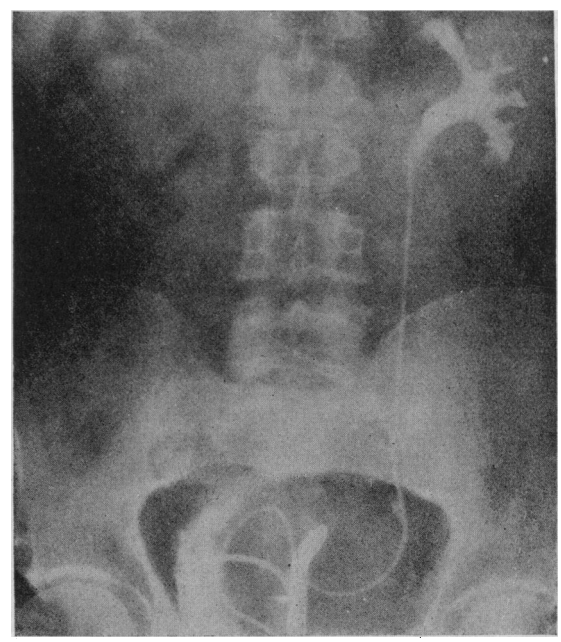

Fig. 3 (Case 2).—Retrovesical extravasation of sodium iodid from ureter.

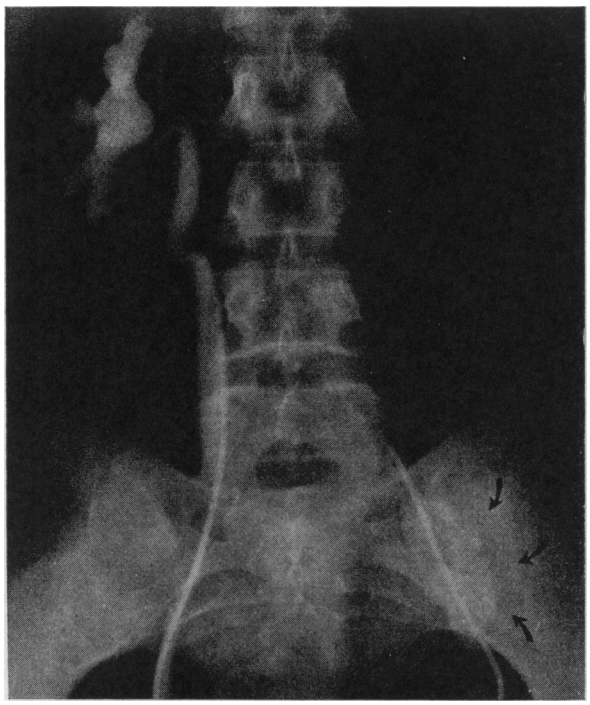

Fig. 4 (Case 4).—Possibly a urinary extravasation, but more probably an incompletely filled left hydroureter.

to dislodge a ureteral stone by manipulation with stiff catheters was unsuccessful; 13½ per cent sodium iodid was injected with a Luer syringe. The patient complained of fire-like burning in the neck of the bladder and the pyelogram showed that although the ureter had been able to resist penetration by the assaults of the catheter, the sodium iodid had leaked through. (The picture is a replica of Fig. 3.) The patient promptly recovered without the development of any untoward symptoms.

* * *

Case 4.—(Courtesy of Dr. James C. Sargent, Milwaukee, Wisconsin.) A 39-year-old woman consulted him on September 28, 1928, with the classical symptoms of right renal ptosis. There was a history of cystitis and right pyelitis beginning at twenty-three. At cystoscopy a No. 6 catheter passed to the left kidney with ease, but on the right met with an impassable obstruction at four and a half inches. A right pyelogram was made and, following the injection of 15 per cent sodium iodid, there was "a stinging sensation in the bladder region." Routine dilatations of the right ureter were carried out at frequent intervals. She had a general visceroptosis with large flabby ureters, a bilateral pyelitis, and unless she was in the Trendelenburg position it was difficult to pass catheters, as the tips caught in the folds of mucous membrane. After an absence of three months she reported on May 9, 1929. She was cystoscoped, No. 6 catheters being used; that on the right met an obstruction at six inches, and on the left at four inches. "Both catheters drained clear urine." Fifteen cubic centimeters of sodium iodid were injected on the right without pain, while on the left five cubic centimeters produced "a typical renal pain. During this injection the solution ran quite freely and no sense of resistance was felt. Both catheters continued to drain." "The patient complained of a slight pain in the region of her left hip and a numbness down the left leg." The pictures showed, on the left, one inch below the tip of the catheter, the shadow of the sodium iodid. It is in the form of an irregular cylinder two inches long and one inch wide, with convoluted sides, and the catheter apparently passes through the center (Fig. 4). In a half-hour she left the office and went home.

Comment.—Doctor Sargent [4] published the case as a catheter perforation of the wall of a practically normal ureter, and it was used with telling effect by the plaintiff in a recent malpractice case. Because of the medico-legal importance of this report, Doctor Sargent sent me a complete copy of all his records of the case and the six pictures, to see if I agreed with his interpretation. I do not believe there is an extravasation. A comparison of the various plates shows that the tip of the left catheter is lying in the course of the ureter; there was no resistance to the injection and the catheter drained freely afterward; there was complaint of temporary parasthesia but not of the burning pain experienced when sodium iodid is injected into the tissues. Unfortunately, bilateral pyelograms were never made and there is no left pyeloureterogram. The pyelographic solution appears to have settled in the bottom of a dilated tube that surrounds the catheter on all sides and shows evidences of peristaltic contractions. There is no resemblance to the other pictures we have of ureteral extravasations. Is this not a hydroureter?

* * *

Case 5.—*Spontaneous perforation of perinephritic abscess into the right ureter, alleged in malpractice suit to be cystoscopic perforation of normal ureter.* A 57-year-old woman complained of fever, palpable masses in the upper left and lower right quadrants, pain, abdominal rigidity, obstipation, and hematuria. A barium enema showed multiple diverticula of the sigmoid and descending colon. Later, from hospital and free clinic records, there was obtained a history of a variety of medical and surgical complaints of many years standing, chief among which were frequency, nocturia, urgency, incontinence, and hematuria; also a two plus Wassermann (University Hospital).

The patient was cystoscoped February 7, 1929, a Braasch cystoscope and No. 5 catheters being used (Fig. 5). Five cubic centimeters of sodium iodid were slowly injected on each side with a Luer syringe (Fig. 6). Following cystoscopy there was an anuria that persisted for several days, but following forced fluids renal function gradually returned. An antagonistic surgeon visited and prescribed for the patient and the cystoscopist at once withdrew from the case. The patient was transferred to San Francisco eleven days after the cystoscopy and under novocain anesthesia the surgeon incised and drained a left perinephritic abscess (that contained no sodium iodid). The operator testified that he inserted his hand through a two and a half inch incision and felt the hole in the ureter. (The patient weighed 208 pounds. The scar is one inch in diameter and directly over Petit's triangle.)

Six weeks later she was recystoscoped by an eminent urologist but no pyelograms were made because of a right anuria. Plain pictures showed a marked elevation of the diaphragm on the right, but its significance not being appreciated the patient was allowed to go home. Five days later, following a hot bath, a mass appeared in the right flank. This proved also to be a perinephritic abscess. The surgeon's fee of $4,000 undoubtedly precipitated a malpractice suit that lasted five weeks.

Comment.—The pyelograms demonstrated the possibilities of trouble from the routine five cubic centimeter syringe injection. If the cystoscopist had used gravity, he would have obtained a good picture and an accurate diagnosis. The films were shown at the Vancouver meeting of the Western Branch of the American Urological Association and there diagnosed as left hydroureter and right

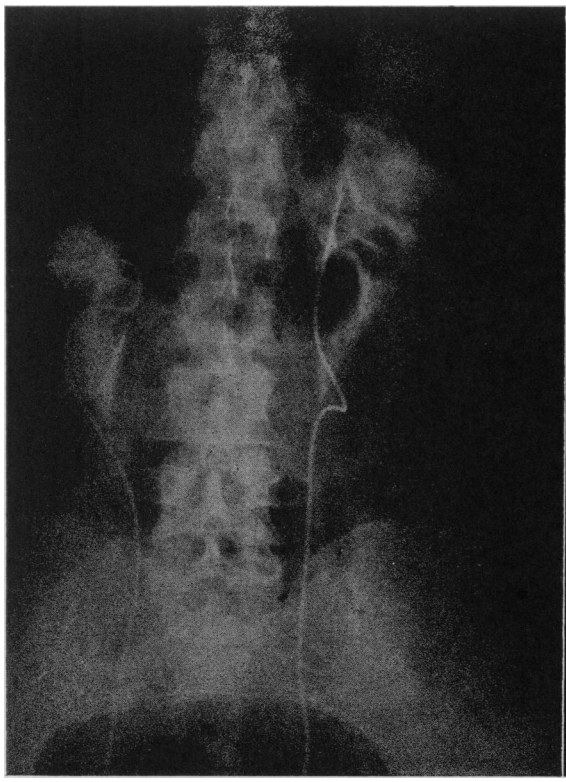

Fig. 6 (Case 5).—Incomplete pyeloureterogram on the reader's left due to use of only five cubic centimeters of sodium iodid, and on the right a partial injection of a perinephritic abscess.

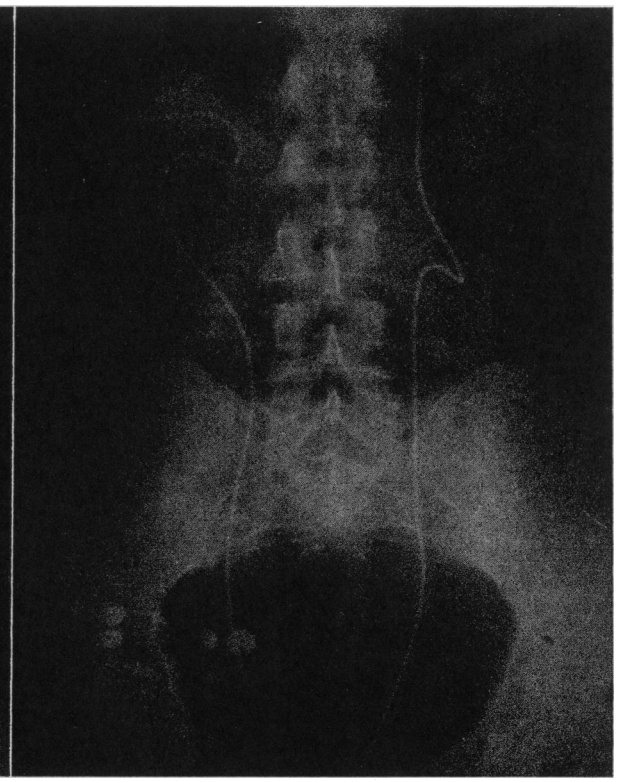

Fig. 5 (Case 5).—Right catheter has passed through a hole in the ureter and lies medial to kidney; psoas shadow is obliterated. Left catheter is coiled in hydroureter. (Pictures are reversed.)

perinephritic abscess, with spontaneous perforation into the ureter, through which opening the catheter had passed. The abscess was apparently draining into the ureter although the psoas muscle shadow is obliterated.

Assuming, as alleged, that both ureters had been punctured at cystoscopy and five cubic centimeters of sodium iodid injected, there would have been a temporary stinging as the injected drug separated the tissues, and after the catheters were withdrawn the sites of punctures would have disappeared, the No. 5 catheters leaving no more permanent openings than would a pin pushed through a coat sleeve. But even if you assumed that gaping holes were left in each ureter, the urine would continue to pass down the patent ureter to the bladder and would not pass out at right angles and burrow into the tissues. When the catheter entered the right perinephritic abscess through the fistula that was undoubtedly plugged with thick pus, a harmless sodium iodid injection was made into the abscess cavity, and when the catheter was withdrawn free drainage of the abscess into the ureter ensued, as in Geisinger's two cases. However, the drainage was not complete, although there was an absence of symptoms for two months; then the fistula blocked and surgical interference was necessary. Failure to operate for perinephritic abscess at once, and particularly on an anuric patient, is not malpractice, for such pathology may persist over long periods of time, Moleen [5] reporting one case of 26 years, Ockerblad,[6] 24, 15, and 12 months, and Habein,[7] 10 months.

The cystoscopist notified the family physician, after an unfriendly surgeon had visited his patient, that he was relinquishing the case, but he made the legal mistake of not formally notifying the family.

At the trial an eminent surgeon testified that he knew of ruptures of normal ureters following the use of syringe pressure in making pyelograms. As urologists we cannot let such a statement go uncorrected, for the mere use of a syringe in making a pyelogram would then *per se* be the potential basis of a malpractice suit. As you well know, I hold no brief for syringe-pressure pyelograms, but there should be no difference between scientific facts in a courtroom and in a medical society.

Pyelograms of the patient had been made a year previous in a hospital clinic and the films were destroyed, on order of the fire marshal, during the period of hysteria that followed the University of California x-ray fire. At the trial, much to the surprise of the urologist who had made the pyelograms, and the hospital superintendent, copies of the destroyed films were offered in evidence and identified by the hospital technician, who did not remember who had given her orders to make them.

OWNERSHIP OF ROENTGEN-RAY FILMS

The question of ownership of roentgen-ray films has never been settled by a court ruling. Recently both the lay and medical press gave wide publicity to the Michigan cases of Hurley Hospital vs. Gage, and Mary Thacker vs. Doctors Barnum and Pinkham. In the first case the patient refused to pay his bill unless he was given the

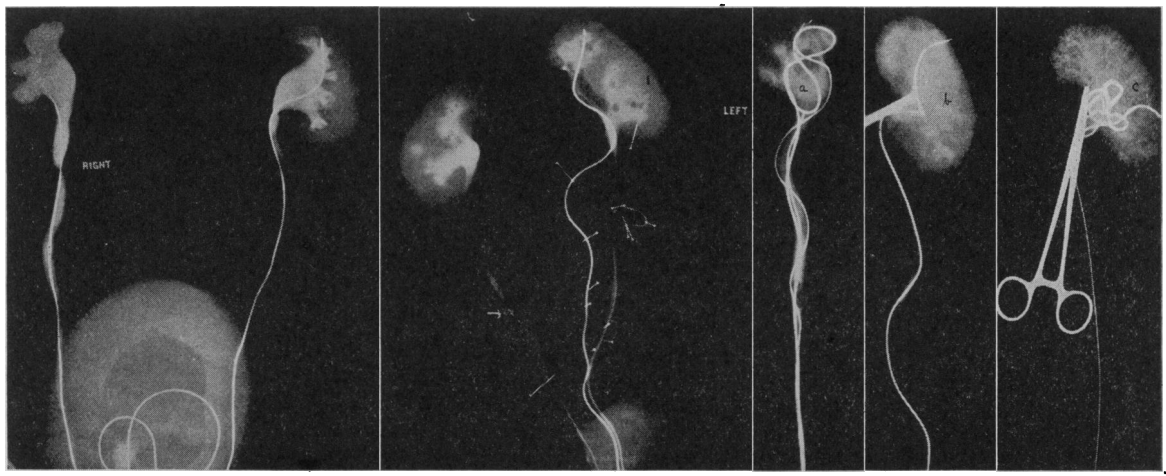

Fig. 7 Fig. 8 Fig. 9a Fig. 9b Fig. 9c

Fig. 7.—Routine cystoscopy of autopsy specimen. As soon as resistance is encountered, the catheters buckled between the end of the cystoscope and the ureteral orifices, and curled in the bladder.

Fig. 8.—Autopsy specimen. Bladder opened, ureteral orifice held with artery forceps and the maximum pressure used in an attempt to perforate the ureters. The right ureter has been tied in a knot and in one of the left ureters an artificial kink was made with pins. The twisted appearance of the ureteral catheters is due to the pressure.

Fig. 9a.—Three catheters in one pelvis, to see if a splinted catheter would not perforate.

Fig. 9b.—Catheter tip perforated kidney cortex, but could not be pushed through the capsule.

Fig. 9c.—Catheter with wire stylet pushed through cortex; then wire was partially withdrawn so as to splint ureter. Instead of further perforation, the catheter coiled in the pelvis.

films. The justice court gave a judgment in favor of the patient, but on appeal the circuit court ruled that the x-ray pictures belonged to the hospital. However, the ruling is of no importance as the patient did not contest and the court was not of such judicial rank as to give its opinion any considerable weight. In the second case the court ruled that the roentgen-ray films belonged to the physicians.

The Radiological Society of North America, at their annual meeting December 16, 1920, attempted to settle the matter by resolution. They resolved that "The radiologist is hereby declared to be a consultant in all cases where he is called upon to examine patients," and "that all roentgenograms, plates, films, negatives, tracings or other records of examination are hereby declared to be the exclusive property of the radiologist who made them, or the laboratory where they were made."

Mr. William C. Woodward, the director of the Bureau of Legal Medicine of the American Medical Association, in a personal communication says that the Michigan cases were "heard and decided in identical courts but in different counties. Their enunciation of rules of law are binding on no court, not even on each other." Furthermore, in the absence of any expressed or implied agreement as to ownership, the general principles of justice would indicate that the patient, the roentgenographer, and the physician had qualified property rights in the pictures. "The physician may need it to protect himself from a malpractice suit. The patient may need it not only to support a suit for malpractice, but possibly to guide some future attending physician with respect to diagnosis and treatment. The roentgenographer may need it to protect himself if he is charged with having delivered the wrong roentgenogram to the physician, or of faulty marking in making the roentgenogram. The interest in all parties, it seems to me, will be best conserved by recognizing that each of the parties has only a qualified property right in it, with the actual right of custody vested in the person whose opinion based on such roentgenogram was sought by the patient. The person having the custody of the roentgenogram would then become a trustee, as it were, for the other or others." In other words, the film belongs to the doctors who ordered it made and the radiologist or patient are entitled to copies at their expense.

EXPERIMENTAL STUDY

A series of kidney and ureters, removed en masse with bladder, obtained at autopsy, were used to see if it were possible to perforate a normal ureter with an ordinary ureteral catheter. The specimens were used within twenty-four hours of removal, and during the interim were kept in the icebox. I have been unable so far, apparently due to the activity of the surgeons, to obtain a pyonephrotic, cancerous, or tuberculous kidney and ureter to experiment with, but I now doubt if they would perforate easily. The specimens used were from patients ranging in age from 19 to 55, and all but one were females; the urine reports of all showed pus in the urine, and the ureters were approximately thirteen inches long; all were photographed, but only the unusual pictures are shown.

Technique.—The technique was first to fill the bladder with water, introduce the cystoscope and catheterize the ureters in the routine manner. The catheters used were new, ranging in size from No. 5 probe point to No. 11 Blasucci. The injections were made with 13½ per cent sodium iodid, and ten-inch gravity pressure overinjected in some cases. Syringe injections were eventually used in an attempt to produce tears by pressure. In all cases, after the tip of the catheter had met with resistance in the kidney or obstructions in the ureter, and force was used, the catheters

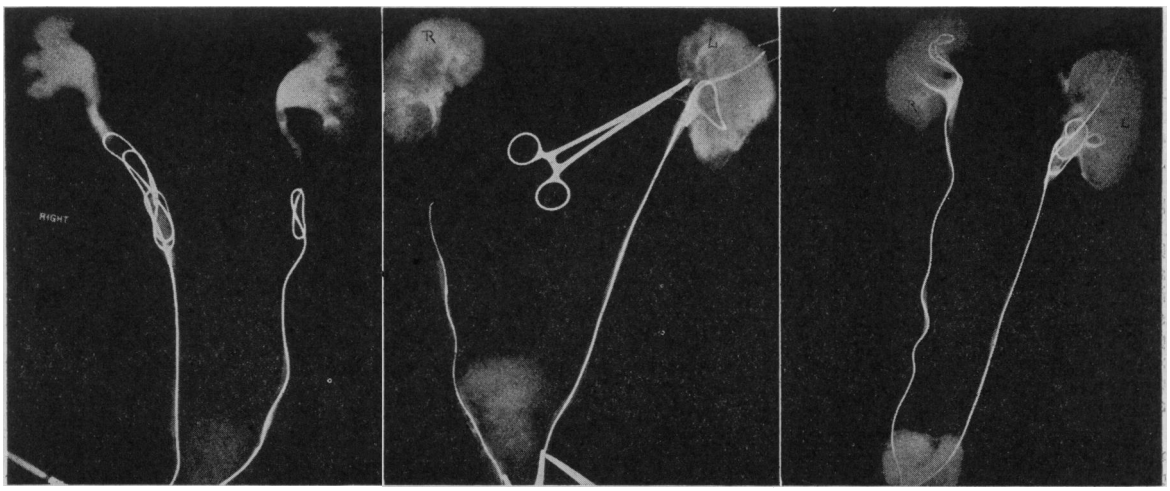

Fig. 10 Fig. 11 Fig. 12

Fig. 10.—A string was tied tight about the left ureter and increased pressure merely caused catheter to coil in the ureter. The right ureter was compressed with a finger and the tip of the catheter followed the edge of the broad stricture and started back down the ureter before coiling began.

Fig. 11.—Two strictures were made on the right with string; catheter tip has bent against first knot. Left catheter perforated cortex but not capsule. Continuous injection of sodium iodid resulted in decapsulation but not rupture of capsule.

Fig. 12.—Right catheter tip is in middle calyx, excessive pressure caused catheter to buckle and form loop in upper calyx. Left catheter perforated cortex but not capsule; continued pressure caused buckling in pelvis.

buckled in the bladder (Fig. 7). The bladders were then opened and the tissue adjacent to the ureteral orifices firmly clamped with artery forceps and the catheters held close so that they could not bend outside of the ureter and attempts made to perforate the ureter or kidney, using all of the force available in my fingers. By means of pins on a board, sharp kinks were made in the ureters and complete occlusion of the lumen was obtained by means of string, or tying the ureter itself into a tight knot (Fig. 8). Again, several catheters were passed into a ureter in order to encourage the presentation of a tip against the wall at an unusual angle (Fig. 9a). After the tip was caught, there was no further advance of the point no matter how great the amount of pressure used, the catheters merely curling in the pelvis. The knotted catheters were then forcibly dragged downward in the ureter but there was no perforation. Artificial strictures in the ureters and stiff catheters resulted in damaged tips or ureteral coils. Catheters with metal stylets introduced to within about one inch of the tip were tried, but the only damage done was to the catheters. On three occasions sharp-tipped catheters were forced through the kidney parenchyma, but I was not able to pierce the capsule (Figs. 9b, 11, 12). Syringe-pressure injection of sodium iodid solution, followed by air, brought about partial decapsulation, but there was no rupture. In one case a tight knot was tied in the ureter, the sides of the meatus seized with clamps and a No. 5 bougie was introduced with such force as to break the bougie tip, but the ureter held. A No. 11 bougie was then tried. It was so large that it could not bend; two assistants with four artery clamps held the mouth of the ureter and sufficient pressure was used to tear the ureter away from the clamps, but eventually the clamps held and the knot was avulsed. Such force, of course, could not be applied to a living subject, as the bougie would buckle in the bladder.

SUMMARY

The wall of a normal ureter cannot be punctured by a catheter, and it is doubtful if a diseased ureter can be perforated unless a deep ulcer is present. Stones by means of pressure necrosis produce leaks or openings through which the stones fall and the resultant perinephritic abscess may drain into the ureter, the bowel, or on the external surface.

A cystoscopic perforation is impossible for the catheter buckles in the bladder if the point meets with resistance. It was to overcome this difficulty that the now rarely used wire stylet was devised. In the experimental study made on autopsy specimens the bladders were finally opened and the mouths of the ureters held with artery forceps so that the maximum of pressure could be exerted by the tip of the catheter. The most severe test was to tie a ureter in a knot and in no case was a catheter perforation produced.

490 Post Street.

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DISCUSSION

A. H. Rosburg, M. D. (450 Sutter Street, San Francisco).—The old saying, "It is an ill wind that blows no one any good," comes true once more, because here out of a $56,000 malpractice suit blew this excellent paper demonstrating the impossibility of rupturing the ureter with a catheter.

I feel certain that it was the many hours of hard labor Doctor Wesson spent on behalf of the defense in this case, the love and respect he holds for decent fellow practitioners, and his utter failure to understand physicians who will testify against a doctor without first getting all of the facts in a case, that inspired him not only to review the literature and report five very interesting cases of injuries to the upper urinary tract by instrumentation, but to perform this unique piece of research work on autopsy material.

In proving beyond all doubt that it is impossible to puncture with a ureteral catheter or to rupture by overinjecting the normal upper urinary tract, Doctor Wesson has performed an absolutely original experiment that is both scientific and practical and will be of great interest to all physicians. It is a certainty that in the future the cystoscopist, when examining and treating the upper urinary tract, will feel greatly relieved to know that it is impossible to puncture by a catheter or to rupture by overinjection the ureter or pelvis of a kidney.

The author was unable to find in the literature but one case of alleged puncture or rupture by instrumentation of kidney, pelvis, or ureter. In his investigation, he procured from the doctor who reported the case the complete history and all roentgen-ray plates, and further investigation showed that the report was an error, as there was no rupture of the ureter.

It so happens that I am intensely interested in the fifth case reported, because in that instance a San Francisco surgeon, testifying under oath for the plaintiff in a malpractice suit against two reputable physicians, made the statement that the puncturing of ureters, pelves, and kidneys by ureteral catheters or the rupturing by overinjection of the pyelographic solution by syringe pressure, was not uncommon in his hospitals. No physician should be prohibited by law or custom from testifying in court either for or against a physician, provided he first informs himself as to the facts in the case and then confines himself to the truth. He should make the same statements in court that he would before a medical society.

In closing, I wish to ask and answer one question: Why did not Doctor Wesson find in the literature more than five cases of injured upper urinary tract due to instrumentation? Because it is apparently impossible to puncture by catheter or rupture by overinjections, ureters, pelves, or kidneys even when diseased, and where extravasation of urine was found it was present prior to the instrumentation.

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Jay J. Crane, M. D. (2007 Wilshire Boulevard, Los Angeles).—Considering the fact that many unique and ingenious ureteral instruments have been devised and are being used liberally through our modern cystoscopes in the treatment and diagnosis of urological conditions, one wonders why more accusations against them, as having caused grave injuries to the ureters, have not been made. I believe that Doctor Wesson has given us the answer when he states that it is impossible to perforate the ureter with a ureteral catheter used through a cystoscope. I know of no authentic case where such an accident has occurred.

I do know, however, that a ureter may be perforated by a small sharp calculus lodged in its lumen with a resultant extravasation of urine. Two such cases have come to my attention in the past three years. Even in the face of these two cases, I wish to state that the incident of major injuries to the ureter is rare as a result of the frequent passage of, at times, unbelievingly large ureteral calculi, whose passage had required many instrumentations, accompanied by long periods of waiting, during which time the intra-ureteral back-pressure has been greatly increased due to the partial and at times complete obstruction.

We are, indeed, very much indebted to Doctor Wesson for this splendid original work which he has given us.

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William E. Stevens, M. D. (870 Market Street, San Francisco).—Several months ago I removed a large stone from the upper third of the left ureter, just below the ureteropelvic junction. At the earnest solicitation of the patient an attempt was made to save the kidney, notwithstanding the presence of infection. No urine having been secreted by the kidney, a ureteral catheter was passed two weeks later. The catheter probably perforated the ureter, resulting in the formation of an abscess. A small portion of the operative wound was reopened and the abscess drained. Improvement in kidney function as well as a decrease in the infection has followed dilatations of the ureter and irrigations of the renal pelvis.

An interesting case of ureteral perforation was described by Noble, who removed a ureteral catheter from the peritoneal cavity. The catheter had been inserted as a guide prior to the extraperitoneal removal of a ureteral stone. It was found when the peritoneum was accidentally opened during the operation. In this case the ureteral wall had no doubt been damaged by the stone, otherwise the perforation would not have occurred.

Bland collected the reports of four hundred and forty-one surgical injuries of the ureters. In three hundred and ten cases, in which the type of injury was mentioned, perforation of the ureter occurred but once. This was the case described by Noble in which the ureter had in all probability been previously damaged.

Doctor Wesson's interesting experiments confirm the opinion that a normal ureter cannot be perforated by an ordinary ureteral catheter. I have never known this accident to occur either in clinic or private practice during the twenty years that my attention has been devoted to urology.

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M. B. Wesson (Closing).—The discussion has emphasized the fact that it is impossible to perforate a normal ureter with an ordinary ureteral catheter, but that it is easy to puncture a ureter at a site weakened by a partially healed infected operative incision or by the erosion of an impacted calculus. Undoubtedly attempted manipulations of incarcerated stones have been frequently accompanied by ureteral perforations, since the stones if left alone frequently spontaneously rupture the ureter. However, since the perforation of the deep ureteral ulcer by the catheter occurs proximal to the block, it is unaccompanied by symptoms. Dr. C. P. Noble was Dr. Howard A. Kelly's successor at Kensington Hospital, so undoubtedly he used a Kelly cystoscope, and the case he reported demonstrates how easy it is to pass a catheter through a ureter into the peritoneal cavity, if an air cystoscope with a wire stylet is used, accompanied by a "fair amount of pressure," even though it "was not considered violence." In his case the perforation was just outside the bladder wall, the splinted catheter apparently not being able to make the turn. (Am. Med., 4:501-504 (Case 8), 1902.)

Three points are brought out in the paper: (1) It is impossible to perforate a normal ureter or kidney capsule with an ordinary ureteral catheter; (2) roentgen-ray plates belong in the custody of the physician who ordered them made; and (3) it may prove to be very expensive and annoying to withdraw from a case without legally notifying all parties concerned.